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A. New Study Programmes in HE today

Including the Bio-Economy field there is a need to consider 5 factors that exemplify the diversification of teaching, learning and research of modern higher education provision:

1. Diversification of the types of higher learning qualifications
2. Diversification of the types of learning modalities
3. Diversification of the profiles of teachers/faculty
4. Diversification of the profiles of higher learners
5. Diversification of the types and forms of university partnerships

B. What does this mean?

1. Diversification of higher education qualifications:

- A move away from traditional 3 cycle degree programmes (Bachelor's Master's, Doctoral studies) towards short courses offered at the higher educational level;
- For example: Micro-Master's, Baby-Bachelor's, professional 'top up' degree programmes, short courses and modules that are aimed at lifelong learners and not just high school leavers;
- Modules and courses that embrace a focus on the bio economy needs but which are not strictly full degree programs and are transdisciplinary in nature and are more accessible to new learners and prior learners from all disciplines.

2. Diversification of learning Modalities

- Delivery of higher education study programs/courses that meet the needs of learners rather than institutional constructs: on-line courses (full or partial); blended learning on-campus and on-line, distance, open and ICT enhanced learning;

3. Diversification of teaching faculty

- The best teachers do not necessarily come from academia – higher education teachers and researchers are often more relevant for forging future practitioners when they emanate from the corporate and work place sectors;
- There is an urgent need for higher education institutions to recognize that the best knowledge and competence often lies outside of the traditional tenure track capacities of higher education researchers and teaching faculty.

4. Diversification of Learners

- Learners accessing higher education are more diverse than ever before: contemporary HE learners are looking for:
 - Re-skilling
 - Upskilling
 - Add-on courses, programmes, and diplomas
- They are often first generation HE learners who know nothing of the Bio-Economy and HE institutions should not assume that they are. The Bio-economy is not a field of study that is familiar to most learners and it would be a folly to assume this.

5. Diversification of partnerships with HEIs

- Universities and the workplace have always been difficult bedfellows – both being distrustful of the other. This has now changed for the modern higher education sector:
 - o Industry/Employer and university partnerships are paramount for curricula development. But it is not simply a one way street: i.e. industry funding research and programmes in HE, but more collaborative: employers and industry being partners of the higher learning environment, of developing study modules, courses and degree programmes.

C. Quality of new HE programs and research?

- Quality Accreditation and quality assuring the above programmes in higher education is of course critical. Partnerships with the bio-economy sector are far more important than national HE structures than intuitional accreditation.
- Professional bodies and employers are far better placed to accredit, quality attest and recognize the courses, modular and qualifications awarded by higher edcucaiton instutions than traditional bodies or mechanisms.
- Research at the HE level: the same rules above apply: Is research in the field of Bio-Economy relevant to national, regional or international development significant, relevant or game changing? Who can judge this?
- To what extent is teaching, learning and research in the bio-economy sector addressing the SDGs - and not just the obvious ones – but all 17. Is bio-economy education trans-disciplinary or just a niche minor by-product of the natural and social sciences?
- What steps are being taken/need to be enforced in secondary and primary education to embed the foundations of bio-economic awareness in early years learners? Is enough being done?

D. Thoughts for Tomorrow?

- “Entrepreneurship education” became a buzz discipline in the 2000s, as had “Critical Thinking” in the 90s. Neither of which warranted a distinct discipline, a standalone course of study or higher education program – as they clearly were cross curricula, transferable and non-disciplinary in nature;
- If the bio-economy as a new subject, module, course or study program is to be taken seriously it needs to learn from the mistakes of previous new ‘breakthrough fields’ or it runs the risk of being sidelined as today’s latest fad.
- I know that, you know that, we all know that - but do educators know it?